APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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EXAMINER
WU, YICUN

ART UNIT	PAPER NUMBER
2175	

DATE MAILED: 04/10/2002

Please find below and/or attached an Office communication concerning this application or proceeding.

PTO-90C (Rev. 07-01)

	Application No.	Applicant(s)
Office Action Summary	09/523,446	CHEN ET AL.
	Examiner	**Art Unit**
	Yicun Wu	2175

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

 A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE _3_ MONTH(S) FROM
 THE MAILING DATE OF THIS COMMUNICATION.
- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed
 after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any
 earned patent term adjustment. See 37 CFR 1.704(b).

Status

1) ☐ Responsive to communication(s) filed on _____ .

2a) ☐ This action is **FINAL**.   2b) ☒ This action is non-final.

3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is
 closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4) ☒ Claim(s) _1-26_ is/are pending in the application.

 4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5) ☐ Claim(s) _____ is/are allowed.

6) ☒ Claim(s) _1-26_ is/are rejected.

7) ☐ Claim(s) _____ is/are objected to.

8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9) ☐ The specification is objected to by the Examiner.

10) ☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

 Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11) ☐ The proposed drawing correction filed on _____ is: a)☐ approved b)☐ disapproved by the Examiner.

 If approved, corrected drawings are required in reply to this Office action.

12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

 a)☐ All b)☐ Some * c)☐ None of:

 1. ☐ Certified copies of the priority documents have been received.

 2. ☐ Certified copies of the priority documents have been received in Application No. _____ .

 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage
 application from the International Bureau (PCT Rule 17.2(a)).

 * See the attached detailed Office action for a list of the certified copies not received.

14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

 a) ☐ The translation of the foreign language provisional application has been received.

15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

DOV POPOVICI
SUPERVISORY PATENT EXAMINER
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Attachment(s)

1) ☒ Notice of References Cited (PTO-892)

2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ .

4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .

5) ☐ Notice of Informal Patent Application (PTO-152)

6) ☐ Other: _____ .

III. DETAILED ACTION

1. Claims 1-26 are presented for examination.

Claim Rejections - 35 USC § 112

2. The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

3. Claims 4-13 and 25 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 4 recites the limitation ``the call pattern cube'' in line 2. There is insufficient antecedent basis for this limitation in the claim.

Claim 6 recites the limitation ``the updated profile cube'' in line 2. There is insufficient antecedent basis for this limitation in the claim.

Claim 7 recites the limitation ``the updated profile cube'' and ``updated profile cube'' in line 2. There is insufficient antecedent basis for this limitation in the claim.

Claim 8 recites the limitation ``the profile cube, snapshot cube, and updated profile cube'' in line 1. There is insufficient antecedent basis for this limitation in the claim.

Claim 11 recites the limitation ``the profile cube, snapshot cube, and the updated profile cube'' in line 1-2. There is insufficient antecedent basis for this limitation in the claim.

Claim 12 recites the limitation ``the profile table'' in line 1. There is insufficient antecedent basis for this limitation in the claim.

Claim 12 recites the limitation ``the call table'' in line 1. There is insufficient antecedent basis for this limitation in the claim.

Claim 12 recites the limitation ``the profile cube and snapshot cube'' in line 2. There is insufficient antecedent basis for this limitation in the claim.

Claim 13 recites the limitation ``the profile cube'' in line 1. There is insufficient antecedent basis for this limitation in the claim.

Claim 25 recites the limitation ``the dimensions'' in line 1. There is insufficient antecedent basis for this limitation in the claim.

Claims 5 is rejected because it depends on rejected claim 4.

Claim Rejections - 35 USC § 103

4.   The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> A patent may not be obtained though the invention is not identically
> disclosed or described as set forth in section 102 of this title, if the
> differences between the subject matter sought to be patented and the prior

art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which the subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

5. Claims 1-26 are rejected under 35 U.S.C. 103(a) as being unpatentable over Jiawei Han, ("Towards On-Line Analytical Mining in Large Databases," ACM SIGMOD Record, 27:1, pp. 97-107, 1998 and Han hereinafter), in view of Tuzhilin (U.S. Patent No. 6,236,978 B1).

Regarding Claims 1, 14 and 21, Han teaches a data processing system having a data warehouse and an OLAP server (i.e. OLAP engine) (Fig. 1), which includes: retrieving a plurality records from data warehouse (i.e. database) (Fig. 1, page 3 paragraph 4); generating a customer profile (i.e. data cubes) based on the records by utilizing OLAP programming and a profile engine (Fig. 1, page 3 paragraph 4).

Han does not teach generating a customer behavior pattern.

Tuzhilin teaches a method for profiling customer behavior and generating a customer behavior pattern (i.e. validated individual rules)(See Fig 3, item 60)

Therefore, it would have been obvious to a person having ordinary skill in the art at the time the invention was made to have modified Han to include: generating customer behavior pattern.

It would have been obvious to a person having ordinary skill in the art at the time the invention was made to have modified Han by the teaching of Tuzhilin to include: generating customer

behavior pattern, with the motivation to more efficiently serve the user as taught by Tuzhilin (See column 1, line 22-26) and in order to detect any abnormal activities.

Regarding claim 2, Han as modified does not teach retrieving records from the call table and based thereon generating a snapshot cube representing the records, the snapshot cube having predetermined dimensions; retrieving records from the profile table and based thereon generating a profile cube representing the records from the profile table, the profile cube having predetermined dimensions that are the same as the dimensions of the snapshot cube; merging the snapshot cube and the profile cube to generate an updated profile cube and deriving a customer calling pattern based on the updated profile cube.

Tuzhilin teaches retrieving records from the call table (i.e. transaction data, See Tuzhilin column 3, line 40-41) and based thereon generating a snapshot cube representing the records, the snapshot cube having predetermined dimensions (See Tuzhilin column 6, line 1-7); retrieving records from the profile table (i.e. static profile, Tuzhilin column 3, line 40-41) and based thereon generating a profile cube representing the records from the profile table (See Tuzhilin column 7, line 60-63), the profile cube having predetermined dimensions that are the same as the dimensions of the snapshot cube (i.e. having corresponding properties, See Tuzhilin column 4, line); merging the snapshot cube and the profile cube to generate an updated profile cube

(See Tuzhilin Fig 2, item 25) and deriving a customer calling pattern based on the updated profile cube (See Tuzhilin Fig 1, item 3).

Therefore, it would have been obvious to a person having ordinary skill in the art at the time the invention was made to have modified Han to include: retrieving records from the call table and based thereon generating a snapshot cube representing the records, the snapshot cube having predetermined dimensions; retrieving records from the profile table and based thereon generating a profile cube representing the records from the profile table, the profile cube having predetermined dimensions that are the same as the dimensions of the snapshot cube; merging the snapshot cube and the profile cube to generate an updated profile cube and deriving a customer calling pattern based on the updated profile cube.

It would have been obvious to a person having ordinary skill in the art at the time the invention was made to have modified Han by the teaching of Tuzhilin to include: retrieving records from the call table and based thereon generating a snapshot cube representing the records, the snapshot cube having predetermined dimensions; retrieving records from the profile table and based thereon generating a profile cube representing the records from the profile table, the profile cube having predetermined dimensions that are the same as the dimensions of the snapshot cube; merging the snapshot cube and the profile cube to generate an updated profile cube and deriving a customer calling pattern

based on the updated profile cube, with the motivation to more efficiently serve the user as taught by <u>Tuzhilin</u> (See Tuzhilin column 1, line 22-26) and in order to detect any abnormal activities.

Regarding claim 3, <u>Han</u> as modified does not teach comparing the customer calling pattern with a known fraudulent pattern, if there is a match, then automatically generating an alert.

<u>Tuzhilin</u> teaches comparing the customer calling pattern with a known fraudulent pattern (i.e. profile matching), if there is a match, then automatically generating an alert (i.e. provides recommendations)(See Tuzhilin column 11, line 65-67, column 12 line 1-3).

Therefore, it would have been obvious to a person having ordinary skill in the art at the time the invention was made to have modified <u>Han</u> to include: comparing the customer calling pattern with a known fraudulent pattern, if there is a match, then automatically generating an alert.

It would have been obvious to a person having ordinary skill in the art at the time the invention was made to have modified <u>Han</u> by the teaching of <u>Tuzhilin</u> to include: comparing the customer calling pattern with a known fraudulent pattern, if there is a match, then automatically generating an alert, with the motivation for providing higher quality user profiles which may facilitate better fraud detection as taught by <u>Tuzhilin</u> (See Tuzhilin column 2, line 53-57).

Regarding claim 4, <u>Han</u> as modified teaches analyzing the call pattern cube (i.e. data cube) by utilizing at least one performing OLAP operation on data cubes (See p3, 2.3).

Regarding claim 5, <u>Han</u> as modified teaches OLAP operations is one of a roll-up operation, a drill-down operation, a dice operation, a slice operation (See page 3, 2.3) and an ad-hoc query (i.e. be able to browse conveniently, See p3, 2.2).

Regarding claim 6, <u>Han</u> as modified teaches storing profile cube (i.e. data cube) back into the profile table in the data warehouse (i.e. database, See Fig 1).

Regarding claim 7, <u>Han</u> as modified teaches performing data staging between the profile table (i.e. table reside in database) and the updated profile cube (i.e. data cube) at predetermined interval (See Fig 1).

Regarding claims 8, 11, 22 <u>Han</u> as modified teaches profile cube, snapshot cube, and updated profile cube (i.e. data cubes) are at least two dimensional and at least two level, and multi-dimensional and multi-level (See page 3, section 2.3).

Regarding claims 9 and 10 <u>Han</u> as modified teaches analyzing call pattern cube (i.e. data cube) utilizing at least one OLAP operations along more than one level and one dimension (See page 3, section 2.3).

Regarding claim 12, <u>Han</u> as modified does not teach profile table (static profile) and the call table (i.e. dynamic profile) each has a plurality of attributes (See Tuzhilin column 3, line 53, column line 4), and the profile cube and snapshot cube each

has a plurality of dimensions (See Tuzhilin column 7 line 59-61, column 6 line 3-7), the attributes corresponding in a one-to-one fashion to the dimensions.

Tuzhilin teaches profile table (static profile) and the call table (i.e. dynamic profile) each has a plurality of attributes (See Tuzhilin column 3, line 53, column line 4), and the profile cube and snapshot cube each has a plurality of dimensions (See Tuzhilin column 7 line 59-61, column 6 line 3-7), the attributes corresponding in a one-to-one fashion to the dimensions (i.e. mapping fields to a multi-dimensional space in one-to-one fashion)(See Tuzhilin column 5, line 11, column 7, line 60-63).

Therefore, it would have been obvious to a person having ordinary skill in the art at the time the invention was made to have modified Han to include: profile table and the call table each has a plurality of attributes, and the profile cube and snapshot cube each has a plurality of dimensions, the attributes corresponding in a one-to-one fashion to the dimensions.

It would have been obvious to a person having ordinary skill in the art at the time the invention was made to have modified Han by the teaching of Tuzhilin to include: profile table and the call table each has a plurality of attributes, and the profile cube and snapshot cube each has a plurality of dimensions, the attributes corresponding in a one-to-one fashion to the dimensions, with the motivation to more efficiently serve the

user as taught by <u>Tuzhilin</u> (See Tuzhilin column 1, line 22-26) and in order to detect any abnormal activities.

Regarding claims 13 and 24 <u>Han</u> as modified teaches profile cube (i.e. data cube) include: at least one cell having probability based value (See page 5, 2nd column, 2nd paragraph).

Regarding claim 15 <u>Han</u> as modified teaches a fraud detection module reporting tool for use by a data analyst to generate a report having selected parameters based on the calling pattern cube (i.e., data cube, See page 3, 2.2, 6th paragraph).

<u>Han</u> does not teach fraud detection with calling pattern cube.

<u>Tuzhilin</u> teaches fraud detection with calling pattern cube (See column 13 line 51-52, column 14 line 28-32).

Therefore, it would have been obvious to a person having ordinary skill in the art at the time the invention was made to have modified <u>Han</u> to include: fraud detection with calling pattern cube.

It would have been obvious to a person having ordinary skill in the art at the time the invention was made to have modified <u>Han</u> by the teaching of <u>Tuzhilin</u> to include: fraud detection with calling pattern cube, with the motivation for providing higher quality user profiles which may facilitate better fraud detection as taught by <u>Tuzhilin</u> (See column 2, line 53-57).

Regarding claim 16 <u>Han</u> as modified teaches analysis tool for use by a data analyst to compare the calling pattern cube to

known fraudulent calling pattern cube (i.e. data cube, page 4, section 2.4, page 5 section 2.5, page 6 section 2.6).

Han as modified does not teach fraud detection with calling pattern cube.

Tuzhilin teaches fraud detection with calling pattern cube. (See column 13 line 51-52, column 14 line 28-32).

Therefore, it would have been obvious to a person having ordinary skill in the art at the time the invention was made to have modified Han to include: fraud detection with calling pattern cube.

It would have been obvious to a person having ordinary skill in the art at the time the invention was made to have modified Han by the teaching of Tuzhilin to include: fraud detection with calling pattern cube, with the motivation for providing higher quality user profiles which may facilitate better fraud detection as taught by Tuzhilin (See column 2, line 53-57).

Regarding claims 17 Han as modified teaches a visualization tools for use by a data analyst to display the calling pattern cube in different formats, levels and dimensions (See page 3, section 2.2, 6th paragraph).

Regarding claim 19 Han as modified teaches analysis tool for use by a data analyst to extract information on selected dimensions, levels, and ad-hoc queries provided by the data analyst (See page 3, section 2.2).

Han does not teach fraud detection with calling pattern cube.

Tuzhilin teaches fraud detection with calling pattern cube. (See column 13 line 51-52, column 14 line 28-32).

Therefore, it would have been obvious to a person having ordinary skill in the art at the time the invention was made to have modified Han to include: fraud detection with calling pattern cube.

It would have been obvious to a person having ordinary skill in the art at the time the invention was made to have modified Han by the teaching of Tuzhilin to include: fraud detection with calling pattern cube, with the motivation for providing higher quality user profiles which may facilitate better fraud detection as taught by Tuzhilin (See column 2, line 53-57).

Regarding claims 18 and 23, Han as modified teaches a data staging tool for transferring data between the profile cube stored in the OLAP server and profile table in the data warehouse at predetermined time intervals (See Fig 1).

Regarding claims 25 and 26, Han as modified does not teach customer profiles wherein the dimension include: a day-of-week hierarchy, a time hierarchy, and duration hierarchy; profile data cube represents a plurality of customers, and the pattern cube represents an individual customer.

Tuzhilin teaches customer profiles wherein the dimension include: a day-of-week hierarchy, a time hierarchy, and duration hierarchy (i.e. purchase), (See column 6, line 13-15); profile

data cube represents a plurality of customers (i.e. cust m-dimensional space, See column 7, line 60-62), and the pattern cube represents an individual customer (See fig 3, item 60).

Therefore, it would have been obvious to a person having ordinary skill in the art at the time the invention was made to have modified Han to include: implementing customer profiles wherein the dimension include: a day-of-week hierarchy, a time hierarchy, and duration hierarchy (i.e. purchase), and profile data cube represents a plurality of customers, and the pattern cube represents an individual customer.

It would have been obvious to a person having ordinary skill in the art at the time the invention was made to have modified Han by the teaching of Tuzhilin to include: implementing customer profiles wherein the dimension include: a day-of-week hierarchy, a time hierarchy, and duration hierarchy (i.e. purchase), and profile data cube represents a plurality of customers, and the pattern cube represents an individual customer, with the motivation to provide a more useful set of individual rules for each user as taught by Tuzhilin (See Tuzhilin column 2, line 39-40). If the user profiles are generated in a highly relevant and comprehensible manner with respect to a specific user, the applications would be able to understand that user's information better, and more efficiently serve the user, and to detect any abnormal behavior in the system as taught by Tuzhilin (See Tuzhilin column 1, line 22-26).

Regarding claim 20, the limitations of claim 20 has been noted in the rejection in claims 1, 2, 8, 9, 10, 11, 13, 15, 16, 17 and 19 above. It is therefore similarly rejected as set forth above.

Prior Art Made of Record

6.   The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

    a.   O. R. Zaiane, M. Xin, and J. Han. ``Discovering web access patterns and trends by applying OLAP and data mining technology on web logs'', In Advances in Digital Libraries, pp. 19-29, Santa Barbara, 1998. Teaches web log mining.

    b.   Surajit Chaudhuri and Umesh Dayal, An Overview of Data Warehousing and OLAP Technology, ACM SIGMOD Record 26(1), March 1997.

    c.   Yost et al. (U.S. Patent No. 6,145,766) teaches personalization, data warehouse, OLAP, and report.

    d.   Beller (U.S. 5,852,819) teaches patterning methods.

    e.   Castelli et al. (U.S. Patent No. 5,978,788) teaches dimension, OLAP, data cube.

    f.   Siegel et al. (U.S. Patent No. 6,018,723) teaches pattern matching.

    g.   Fawcett et al. (U.S. Patent No. 5,790,645) teaches profiling, fraud detection and matching.

h. Basch et al. (U.S. Patent No. 6,119,103) teaches OLAP and pattern matching.

i. Pham et al. (U.S. Patent No. 5,970,482) teaches predictive knowledge model.

j. Agrawal et al. (U.S. Patent No. 5,799,300) teaches method and system for performing range-sum queries on a data cube.

k. Kamel et al. (U.S. Patent No. 5,937,037) teaches individual profile.

l. Malloy et al. (U.S. Patent No. 5940818) teaches attribute-based access for multi-dimensional databases.

m. Greco et al. (U.S. Patent No. 5809478) teaches a typical data warehouse architecture that has data source, periodically refreshing, loading, data warehouse, OLAP servers, meta data, hierarchical multidimensional data cube, analysis tool, query/reporting tools and data mining engine/tools.

Conclusion

7. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Yicun Wu whose telephone number is 703-305-4889. The examiner can normally be reached on 8:00 am to 4:30 pm, Monday -Friday.
If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Dov Popovici can be reached on 703-

305-3830. The fax phone numbers for the organization where this application or proceeding is assigned are 703-308-5397 for regular communications and 703-308-5397 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-305-3900.

Yicun Wu
Patent Examiner
Technology Center 2100

April 3, 2002

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